

Breakout Session
Pretreatment of Al and Mg Alloys
– Structural and Electronic

DoD Metal Finishing Workshop

Layton, UT

May 17, 2007

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Scope

- Focus on pretreatments
 - Primers and inhibitors are related but not specific to discussion
- Applications on structural alloys and castings
- OEM and depot/repair/rebuild operations

Magnesium Alloys

- Castings
 - AZ91, ZE41, ???
- Current processes are common for all alloys
 - Dow 7 for mfg, Dow 19 for repair/rework
- Requirements:
 - Corrosion protection
 - Standalone
 - Needed for “in process” protection of parts
 - Painted/coated
 - scribed
 - Paint adhesion
 - Performance of parts in service

Alternative processes

- Tagnite and Kironite are OEM processes
 - Brush Tagnite is a difficult process
 - Performance equivalent to Dow 19
- Tagnite + Rockhard performs well on selected parts
 - Barrier coating important for corrosion protection
- Aluminum cold spray or electroplate for protection and galvanic protection?
 - By design
 - Process used in repair/rework
 - TCP as conversion coating for both Mg and Al??

Needs for Mg

- Mg specific resin systems for barrier properties
 - Nonchromate inhibitors for Mg and barrier
 - Damage resistant coating
 - Powder coat?
 - “panther grip” + barrier system?
- Aluminum on Magnesium by design
- High strength aluminum casting materials

Aluminum Alloys

- Structural and components
 - 6061
 - 7075 (7050)
 - 2024 (22219,2124), LiAl (2219,2195)
 - 3xxx, 5xxx
 - A356, A380
- CrCC used for all alloys
 - No alloy specificity
 - OEM and repair/touchup
 - Detail parts and assemblies

Categories of Use

- Component parts and assemblies
 - Immersion tankline
- Large assemblies, mold line/exterior
 - Paint/repaint of aircraft, ships, vehicles
 - Shuttle external tank
 - Etc.

Conversion Coating Requirements

- Adhesion
 - Organic coatings to Aluminum
- Corrosion protection
 - Standalone for process and some applications
 - Class 3 for low electrical resistance
 - Standalone corrosion resistance implied
- Compatible with mixed metal assemblies
 - Minimizes masking and/or removal
- Process controls
 - Which alloys? Procedures?

NonChromate Conversion Coatings

- Alternatives
 - TCP (NAVAIR, 4 vendors)
 - NCP/IrTCP (not for all alloys)
 - Boegel (3 vendors)
 - Prekote
- Application methods
 - All can be sprayed
 - All but Boegel can be used in immersion tanks
- All require chromated primer when painted

Needs for NonCrCC

- Gain understanding of interaction of cleaning and deoxidation with TCP and others
 - Interest in all alloys including LiAl and 7xxx
- Interaction between NCr inhibitors and coatings with NCrCC

Critical for DoD Implementation

- Develop strategies for implementing new technologies
 - Needs to be at least service wide
 - AF, Navy, Army
 - Support incremental technology insertion
 - Define classes of applications where performance requirements are met